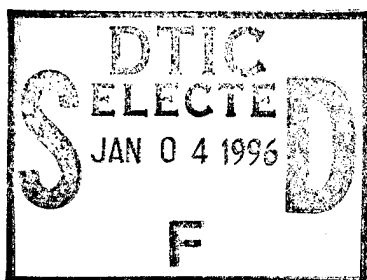


NAVAL HEALTH RESEARCH CENTER

USER'S GUIDE FOR THE NAVY
COMPUTER ASSISTED MEDICAL DIAGNOSIS (NCAMD) SYSTEM
VERSION 2.0



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User's Guide for the Navy
Computer-Assisted Medical Diagnosis (NCAMD) System
Version 2.0

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Summary

The Navy Computer-Assisted Medical Diagnosis (NCAMD) system is designed to assist Independent Duty Corpsmen (IDCs) in rendering a medical diagnosis. The NCAMD system was written using Microsoft FoxPro, Version 2.0, database management system. For each encounter the signs, symptoms, and laboratory information collected can be gathered on data entry forms created for NCAMD or entered directly (real time) into the system. A Chronological Record of Medical Care (SF600) can be generated automatically to document the encounter.

The NCAMD system User's Guide was written to familiarize the IDCs with the NCAMD software. The keyboard and mouse commands necessary to run the various options are explained in conjunction with the associated screens.

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Section 1 Introduction

1.1 Purpose of the Navy Computer-Assisted Medical Diagnosis (NCAMD) System User's Guide. The purpose of the user's guide is to provide Independent Duty Corpsmen (IDCs) with the information necessary to effectively use NCAMD. In this user's guide, the basic structure and features of the NCAMD system will be explained.

1.2 Navy Computer-Assisted Medical Diagnosis (NCAMD). Medical care on board many small ships and submarines is the responsibility of IDCs. These vessels often operate in remote areas where IDCs cannot easily obtain consultations. Therefore, the Navy Medical Research and Development Command (NMRDC) initiated a program to develop a set of diagnostic algorithms that could be automated. The objectives of this effort are to:

- Provide medical practitioners with accurate medical diagnostic and treatment information
- Prevent unnecessary, hazardous, and disruptive medical evacuations by providing diagnostic assistance to IDCs
- Improve communications between isolated IDCs and their supporting medical officers by providing a standardized method for information collection
- Gather clinical information in a modifiable diagnostic knowledge base to ensure diagnostic accuracy

1.3 References. The following references are provided as technical and background information.

- FoxPro Commands and Functions (1991). Fox Software, Inc. Perrysburg, Ohio.
- ICD-9 CM, International Classification of Diseases 9th Revision (1980). U.S. Department of Health and Human Services.
- Abdominal Pain -- A Decision Support System for the Management of Acute Abdominal Pain, Version 3.0, Programmer's Manual (1989). Naval Submarine Medical Research Laboratory Technical Report No.1148; Groton, CN.
- Chest Pain -- A Decision Support System for the Management of Acute Chest Pain, Version 3.0, Programmer's Manual (1989). Naval Submarine Medical Research Laboratory Technical Report No. 1149; Groton, CN.

1.4 Terms and Abbreviations.

- **Carriage Return <CR>**. Notation used to denote a carriage return typically executed by pressing the <ENTER> or <RETURN> key on a computer keyboard. If a mouse is available on the computer system, "click" or press the top left button for a return.
- **Database Management (DBM)**. A management approach to database design consisting of what information is collected, where it is stored, and how it is processed by computer software.
- **Default**. A response assumed by NCAMD. If the default value is correct, the user need only press the <ENTER> or <RETURN> key.
- **Expert System**. A computer program that emulates the behavior of a human expert in a specific area of knowledge.
- **FoxPro**. A database management development system written by the Fox Software, Inc. FoxPro, Version 2.0, was used to develop the NCAMD system.
- **NCAMD**. Navy Computer-Assisted Medical Diagnosis.
- **SAMS**. SNAPS Automated Medical System, Version 7.0, is a FoxPro software application for handling shipboard medical department forms, files and data.
- **SNAPS**. Shipboard Non-tactical ADP Program.
- **System**. The combination of hardware, firmware, and software designed to function as an integrated unit.
- **SF600**. The Chronological Record of Medical Care standardized form used for documenting a medical encounter.

Section 2 System Summary

2.1 System Application. IDCs provide medical services on many U.S. Navy submarines and small surface ships. To assist the corpsmen and enhance their diagnostic skills, the U.S. Navy has initiated the development of the NCAMD system.

2.2 Programming Language. The NCAMD software was written in the FoxPro, Version 2.0, programming language. FoxPro is a DBM system created for the personal computer to produce computer applications.

2.3 Security/Privacy. The security module will maintain user passwords allowing log-on access to NCAMD and its database files. Menu options are assigned to the user through a security key system in FoxPro. NCAMD collects and stores data covered under the 1974 Privacy Act.

2.4 Flexibility. Since NCAMD was created by using the FoxPro utilities, enhancements and updates to the system can be accomplished with minimal programming. NCAMD was design to compatible with SAMS.

2.5 Maintenance. The primary maintenance functions consist of security options, file and format definitions, user file updates, knowledge base editing, and initialization of data.

2.6 "Too Many Files Open" Error Message. If the "Too many files open" message occurs, the following window will open. Select <Cancel> to end the program and return to the root directory (cd c:\). Modify the CONFIG.SYS by adding or editing the FILES command to a minimum of 50 files (FILES = 50).

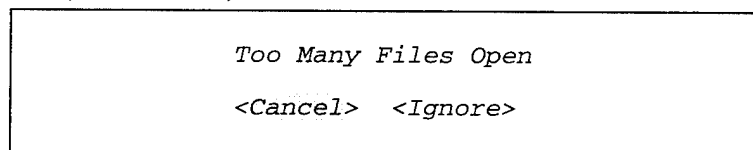


Figure 1. Error Message

2.7 "Out of Environment Space" Message. If an "Out of Environment Space" Message occurs, change the CONFIG.SYS file. Return to the root directory (cd c:\) and modify the CONFIG.SYS by adding the SHELL command. The "/P" will make it permanent and the "E/:(size)" will expand the environment space from the default of 160 bytes. Reboot the system after changing the CONFIG.SYS.

```
SHELL=COMMAND.COM /P /E:512 (DOS Version 3.2 and above)
SHELL=COMMAND.COM /P /E:32 (DOS Version 3.1 and below)
```


2.8 System Organization. The system has 5 main menus which are (1) System, (2) File, (3) Edit, (4) Diagnosis, and (5) Window. Accessing the system requires a password (see Section 3). Once the password is successfully entered, the top menu, shown in Figure 2, will appear.

<i>System</i>	<i>File</i>	<i>Edit</i>	<i>Diagnosis</i>	<i>Window</i>
<p><i>Navy Computer-Assisted Medical Diagnosis (NCAMD)</i> <i>Version 2.0</i> <i>Naval Health Research Center</i> <i>San Diego, CA</i></p> <p><i>Press the <F1> key for help</i></p>				

Figure 2. Main Menu

2.9 Menu Options. All NCAMD system options are shown in Figure 3. The system is operated using either a mouse or the keyboard to select these options.

System	File	Edit	Diagnosis	Window
Help ... F1	Reindex Quit	Undo Redo	Register Patient Encounter	Cycle ^F1
Change Password Backup Restore		Cut Copy Paste Clear	Disease/Treatment Lookup SF600 Report	Color _____
Calculator Calendar/Diary		Select All	Training Mode	
		Goto Line		

Figure 3. Menu Options

Section 3 Accessing the System

3.1 Entering NCAMD (Log-On). Change the current directory to NCAMD or the one in which NCAMD was installed on the system (c:\CAMD). At the MS-DOS prompt, type CAMD and the following security prompt will be displayed.

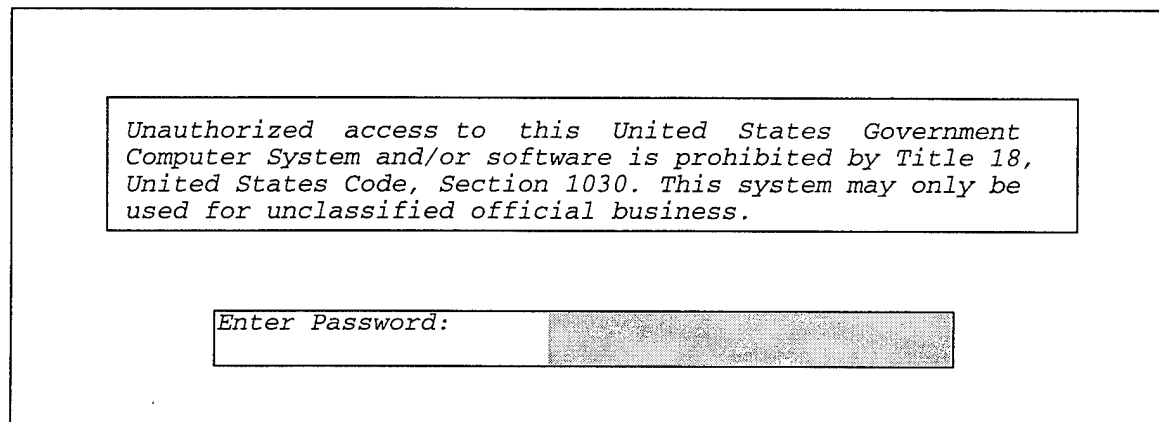


Figure 4. Log-On Screen

Type in the password and <CR>. After an acceptable password has been entered a brief greeting will be shown.

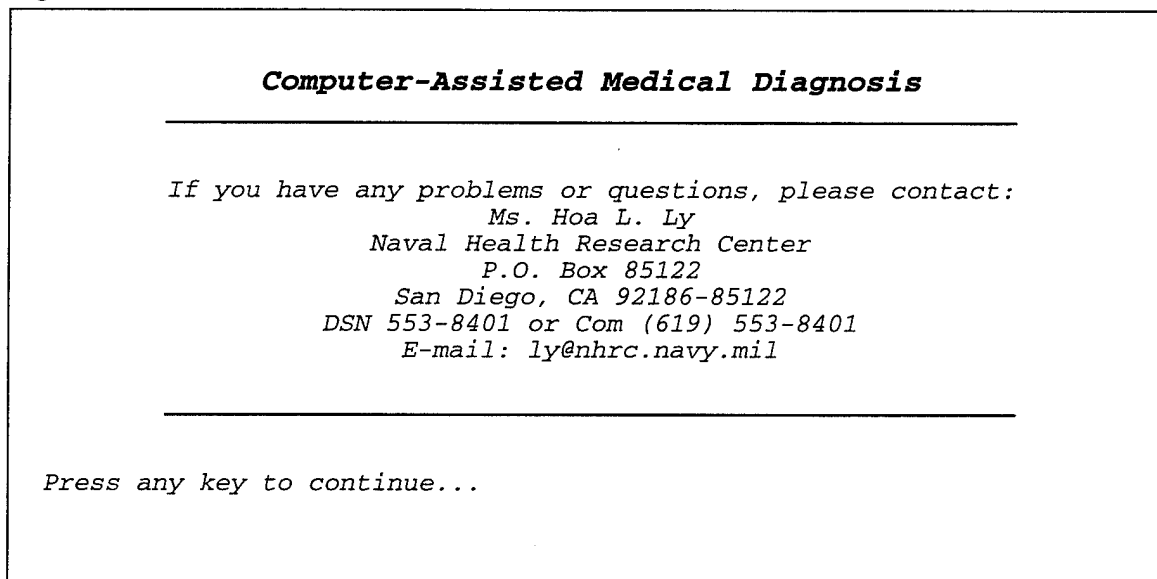


Figure 5. Greeting Screen

Navy Computer-Assisted Medical Diagnosis (NCAMD)

The Navy Computer-Assisted Medical Diagnosis (NCAMD) system contains disease descriptions, diagnostic assistance, and treatment recommendations. Only the most common diseases in each category are considered for medical diagnosis. The nonspecific disease in each area represents nonsurgical, nonlife-threatening cases, which in general do not require evacuation.

YOUR JUDGMENT MUST TAKE PRECEDENCE. The NCAMD system cannot make the subjective evaluations that are often so important in medical diagnosis.

The <F1> key will give additional help ...

Press any key to continue ...

Figure 6. Greeting Screen Continued

3.2 Exiting the NCAMD (Log-Off). Choose <Quit> from File options to exit NCAMD.

System	File	Edit	Diagnosis	Window
	Reindex			
	Quit			

If any windows are left open the following window will appear:

Windows are still opened.
Do you want to close them?

<YES> <NO>

Figure 7. File Options

3.3 Mouse Techniques

- **Point.** Position the pointer (arrow) at the specific location on the screen. The pointer moves in the same direction as the mouse.
- **Click.** Point to an object, then press and release the mouse button once.
- **Double Click.** Point to an object, then press and release the mouse button twice in rapid succession.
- **Drag.** Hold the mouse button down, roll the mouse until the pointer is in the desired location, and release the mouse button.

3.4 Choosing Menu Options

- **Keyboard.** Use the <Alt> key in conjunction with the highlighted letter of the menu pad. To access the File menu option, for example, press <Alt> <F>, then press <CR>.
- **Mouse.** Point to the menu pad and press the left mouse button to display the menu popup window. Point to the desired option and press the left mouse button.

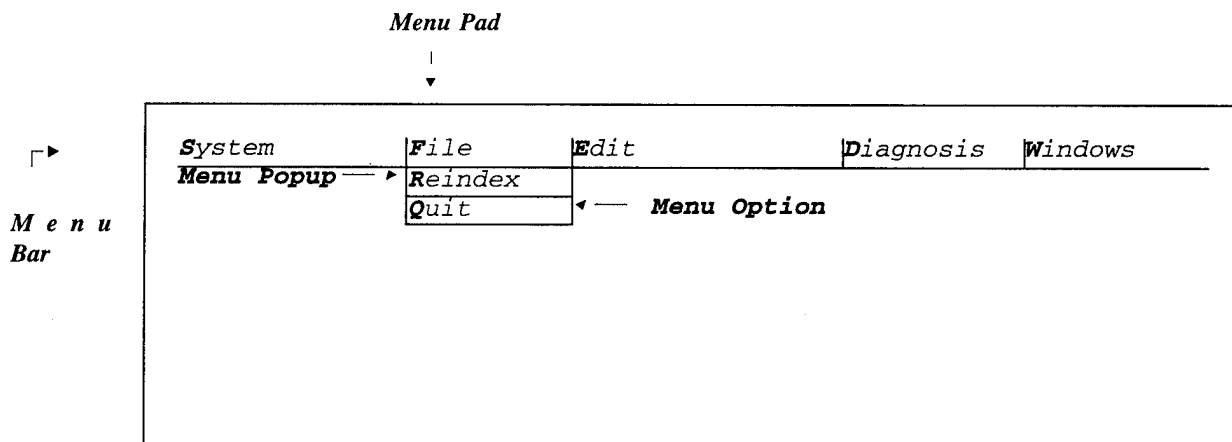


Figure 8. Menu Popup Window

3.5 Dialogs. Dialogs are special boxes for data entry that allow the user to choose the action about to take place.

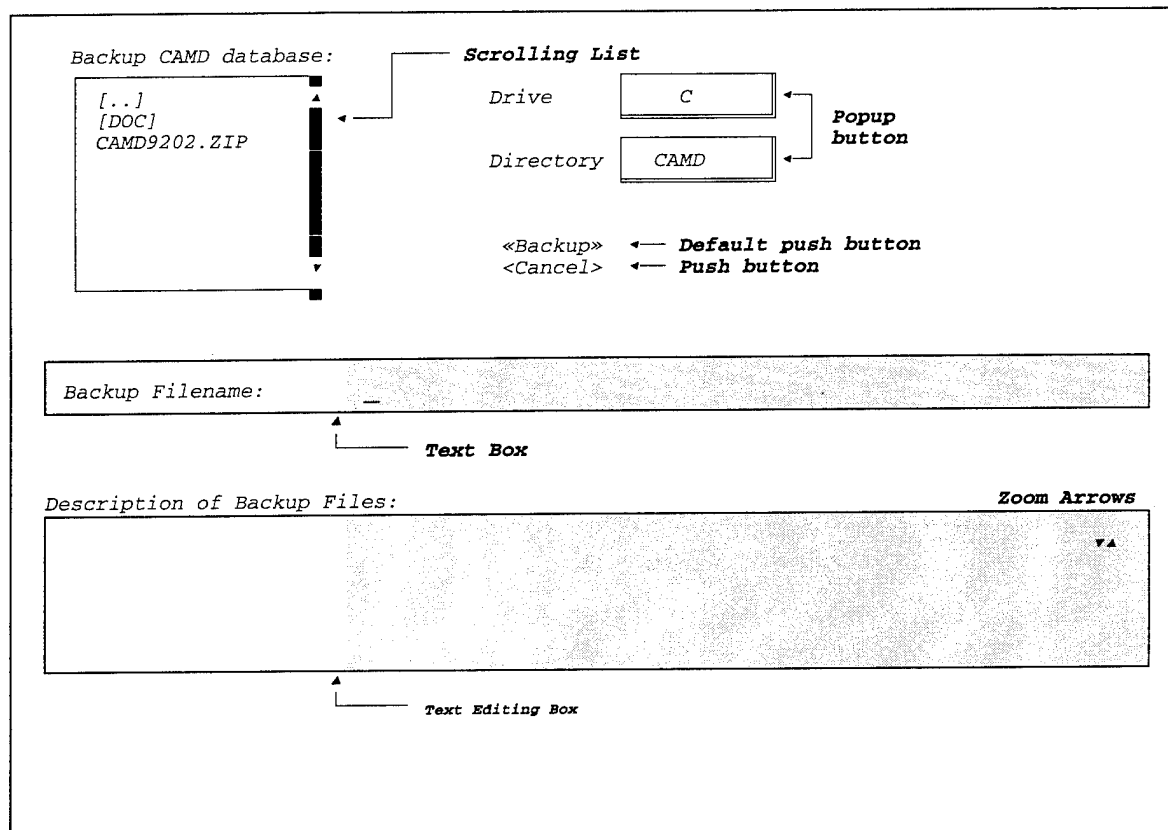


Figure 9. Example of Dialog Boxes

3.5.1 Scrolling a List

- **Keyboard.** Use the arrow keys <▲> or <▼> to select an option, then press <CR>.
- **Mouse.** Click on the up or down arrow on the scroll bar. Then holding down the mouse button on either arrow will cause the scrolling to continue until released.

3.5.2 Choosing an Option on a Popup

- **Keyboard.** Press the <Tab> key to the popup control. Then press <CR> to open the window. Choose an using the arrow keys, and press <CR>.
- **Mouse.** Point to the popup control and press the mouse button to display the popup. Drag to the desired option, then release the mouse button.

3.5.3 Choosing a Check Box, Radio Button, or Push Button

- **Keyboard.** Press the <Tab> key to move the cursor to a check box, radio button, or push button, then press <CR>.
- **Mouse.** Point to a check box, radio button, or push button, then press the left mouse button.

3.5.4 Text Editing Box. The text editor allows the user to type and modify information displayed in a region of the screen (e.g., Treatment or SF600 Report). When text editing, use the cursor to move through the text. The cursor looks like a flashing underscore, when in the insert mode, and a flashing box when in the overwrite mode. Press the <Insert> key to switch between modes. It is easy to move the cursor through text using 8 basic keys. Four of these keys can also be used in combination with a modifier key <Ctrl> to move the cursor a greater distance. See Appendix A for the table of Text Editor Commands.

3.5.5 Zoom Arrows

- **Keyboard.** To increase (▲) or reduce (▼) the box size <Tab> to the appropriate arrow, and press <CR>.
- **Mouse.** Point to the desired arrow and click.

Section 4 System Transactions

4.1 System Menu. To access the top level menu options using the mouse, point to the option and click. To use the keyboard press down the alternate function key and the first letter of the option (e.g., enter <Alt><S> to access the System menu. The System menu options are used for file maintenance and desk accessories.

<i>System</i>	<i>File</i>	<i>Edit</i>	<i>Diagnosis</i>	<i>Window</i>
<i>Help...F1</i>				
<i>Change Password</i>				
<i>Backup</i>				
<i>Restore</i>				
<i>Calculator</i>				
<i>Calendar/Diary</i>				

Figure 10. System Menu Options

4.1.1 Help <F1>. On-line assistance can be obtained by pressing the <F1> key at any time. NCAMD provides context-sensitive help that can be accessed by pressing <F1> or selecting the <Help> option on the System menu.

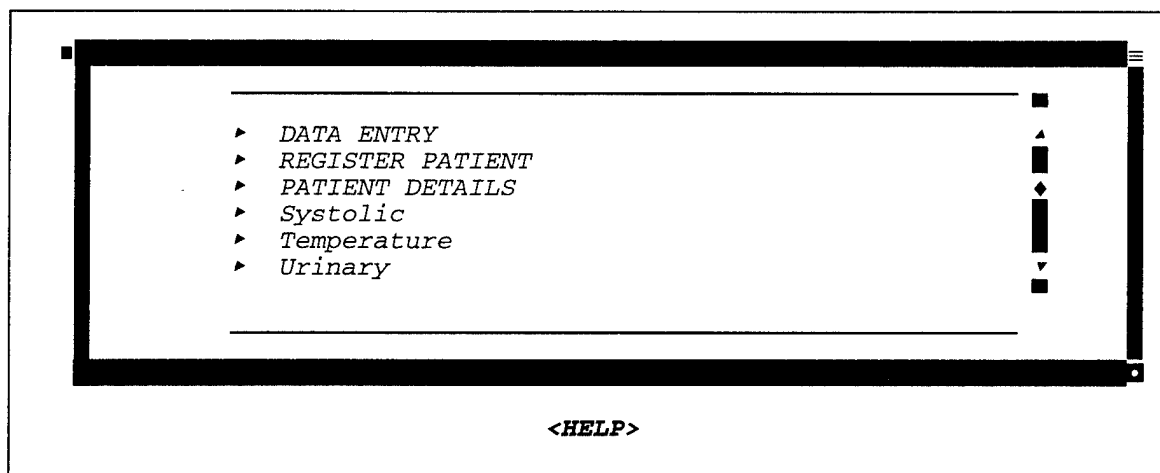


Figure 11. Help Topics Window

For more details on a particular topic, select the <<Topics>> button and press <CR>. To see information about the following topic in the system, choose <Next>. To see information about the previous topic, choose <Previous>. The <Look Up> and See Also functions are not used by the NCAMD system. To close the <HELP> window using the keyboard press the escape <ESC> key. To close it using the mouse, point to the small white rectangle in the top left corner of the window and click.

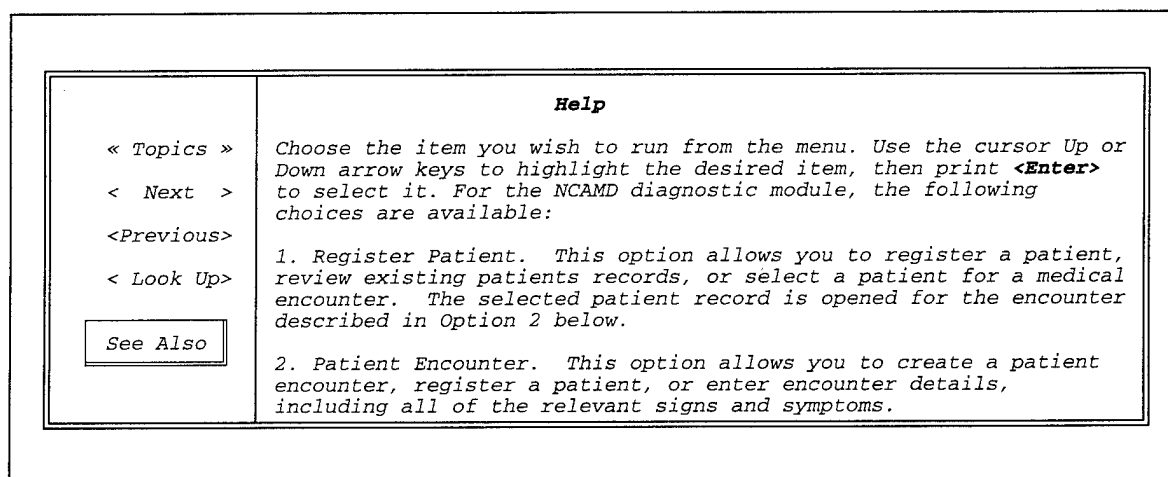


Figure 12. Help Detail Window

4.1.2 Change Password. This option lets the user to change the password. When **Change Password** option is chosen from the System menu, type a new password and press <CR>. Remember this change is permanent, so memorize the new password or make a notation and place it somewhere safe.

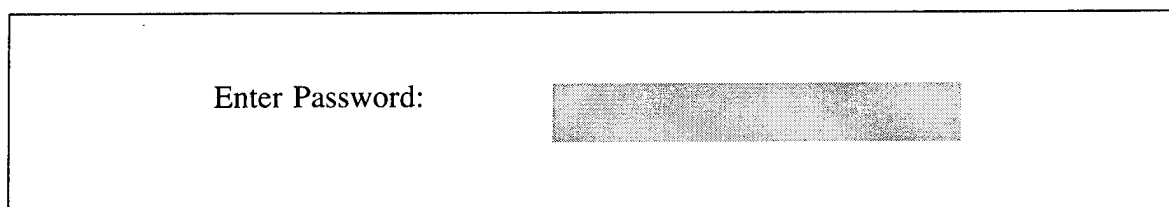


Figure 13. Change Password

4.1.3 Backup. The **Backup** option is used to copy the database to another file. Select the drive and directory where the file is to be stored, enter a name for the backup file, and select the **<<Backup>>** button. The system will automatically begin this process and display a message when finished. In Figure 14, the backup file was named CAMD9503.BCK. The 9503 represents the year and month in which the files were saved.

Backup CAMD database:

[..] [DOC] CAMD9502.BCK	Drive	C
	Directory	CAMD

Backup Filename: CAMD9503.BCK

<< Backup >>
< Cancel >

Figure 14. Backup Screen

4.1.4 Restore. This option allows the user to restore or reinstall the database previously backed up by the NCAMD system. To restore a backup file, enter the disk drive and directory where the backup file was stored, enter the name of the file, and select the **<<Restore>>** button. The system will automatically begin this process and display a message when finished.

Restore CAMD database:

[..] [DOC] CAMD9502.BCK CAMD9503.BCK	Drive	C
	Directory	CAMD

Restore Filename: CAMD9503.BCK

<<Restore>>
<Cancel>

Figure 15. Restore Screen

4.1.5 Calculator. When the user chooses the **Calculator** option from the System menu, a graphic of a calculator appears on the screen. This calculator used like a standard pocket calculator and can be used by keyboard or the mouse. To use the mouse, simply click on the appropriate numbers and symbols on the calculator. With the keyboard, type the equation as it would be written. Most calculator keys have the same keyboard equivalents.

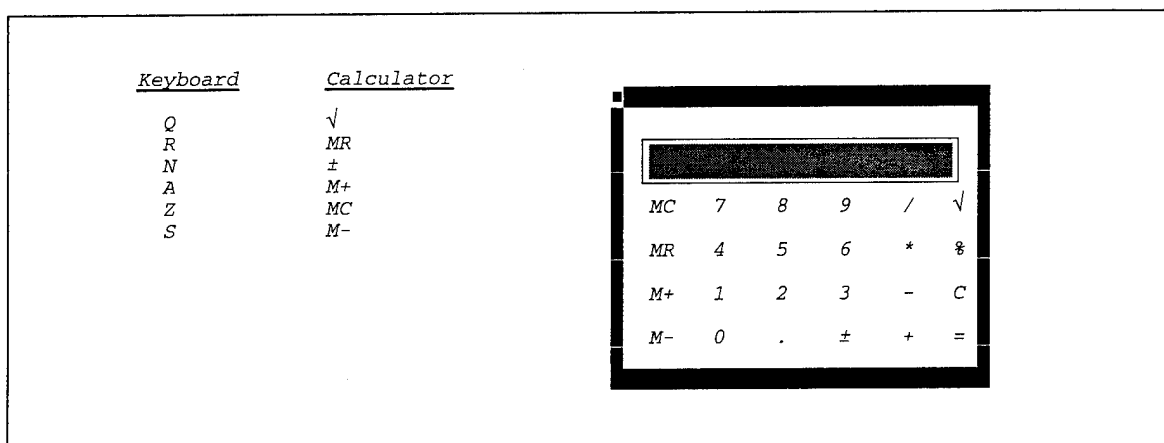


Figure 16. Calculator

4.1.6 Calendar/Diary. When the user chooses the **Calendar/Diary** option from the System menu, a monthly calendar appears with the current day selected. This calendar is used just like any other calendar to check dates and keep track of appointments. Once it has been used, the default then becomes the last day selected. To close this menu option, press <ESC>.

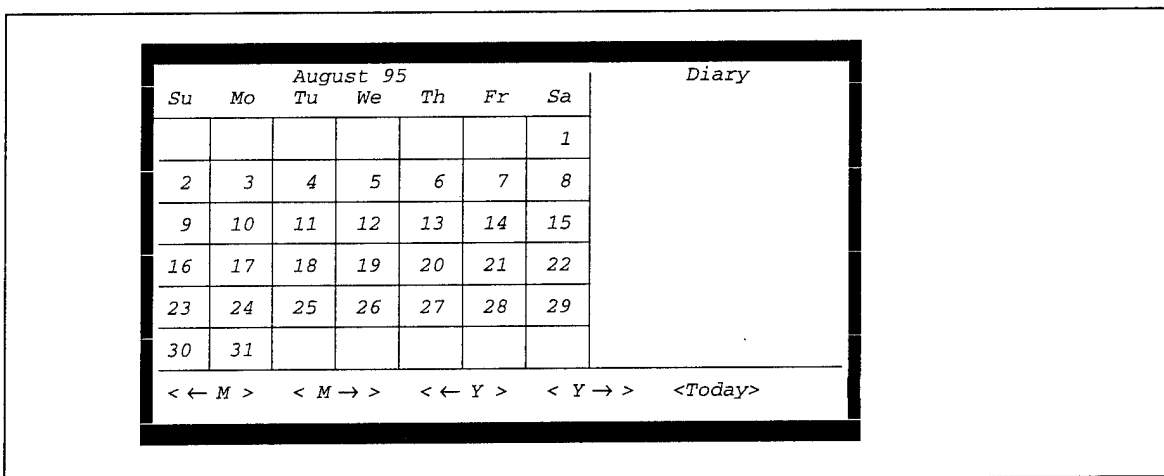


Figure 17. Calendar/Diary

To the right of the Calendar panel is the Diary panel. Use the Diary panel to input text associated with any date on the calendar panel. To activate the Diary panel, press <Tab> or choose Diary from Diary menu. To activate the Calendar panel, press <shift><Tab> or choose Calendar from the Diary menu.

4.2 File Menu. The File menu contains options for manipulating data files. Currently there are only two options on this menu: Reindex and Quit.

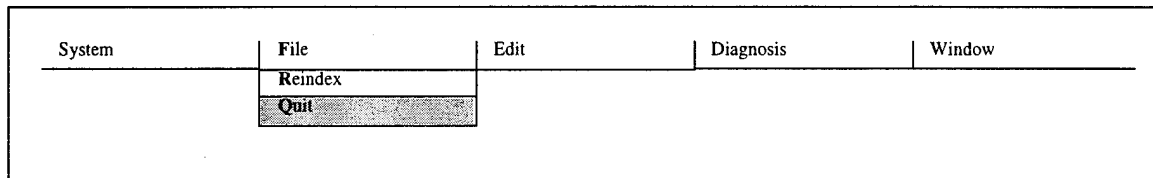


Figure 18. File Menu

- **Reindex.** This option is used to reindex or sort the database files. When the user chooses the **Reindex** option from File menu, a brief message will be displayed. The window will disappear when the task is completed.
- **Quit.** The **Quit** option ends current NCAMD session. When chosen, a message will be shown on the screen, and will return to the MS-DOS prompt (c:\CAMD).

4.3 Edit Menu. The Edit menu options are used from within the **Diagnosis** menu, when editing the treatment section of an encounter or a SF600 form.

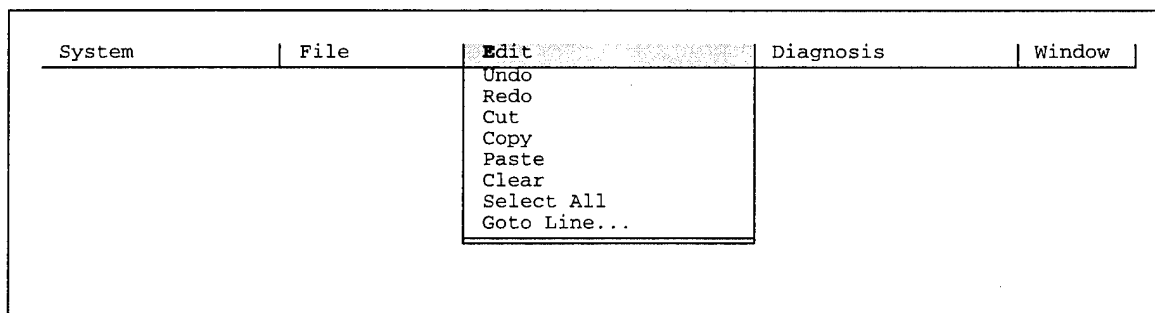


Figure 19. Edit Menu

- **Undo.** Reverses the last action that was performed while text editing. Selecting the **Undo** option repeatedly will reverse all entries made during the current editing session.
- **Redo.** This is the opposite of **Undo**. Choose **Redo** to restore the text to its previous condition. Selecting this option will reverse the **Undo** option.

- **Cut.** Removes selected text from any field, record, or text editing field.
- **Copy.** Duplicates the selected text and places it on the clipboard.
- **Paste.** Inserts a copy of the clipboard contents into the current file, field, or text editing window at the cursor location. It will replace the contents of the clipboard with the selected text.
- **Clear.** Permanently removes selected text without placing it on the clipboard. If the user chooses this option when text is selected, the result is the same as pressing the or backspace keys. Additionally, the **Clear** option is used to erase a window or the desk top.
- **Select All.** All lines of text in the current editing window are selected.
- **Goto Line.** Displays the <<Goto>> dialog box shown below. When this option is chosen, the cursor moves to the beginning of the specified line, and the text line is displayed in the window. If the line number specified is greater than the number of lines in the window, the cursor is positioned on the last line.

Line Number:

« Goto » < Cancel >

Figure 20. Goto Line Dialog

4.4 Diagnosis Top Menu Option. Currently, NCAMD has 3 diagnostic modules: Abdominal Pain, Chest Pain, and Ocular Pain. Each area has its own medical diagnosis, disease, and treatment databases. The diagnosis data is grouped by disease categories, in which only the most common diseases are considered. The Diagnosis menu is the main menu for NCAMD, see Appendix B. for examples of encounter forms for the Chest Pain and Abdominal Pain Modules.

System	File	Edit	Diagnosis	Window
			Register Patient Encounter Disease/Treatment Lookup SF600 Report Training Mode	

Figure 21. Diagnosis Menu

4.4.1 Register Patient. When the **Register Patient** option is selected a patient selection window opens (see Figure 23). The patient database can be searched using complete or partial names or social security numbers. A question mark <?> can be used as a wild card character. After the information is entered, select the <**Browse**> button to search for a patient. When using the keyboard press <**Tab**> until the cursor is located on top of the button, then press <**CR**>.

System	File	Edit	Diagnosis	Window
			Register Patient Encounter Disease/Treatment Lookup SF600 Report Training Mode	

Figure 22. Register Patient

<i>PATIENT SELECTION</i>	
<i>Social Security:</i>	- 2222
<i>Last Name:</i>	_____
<i>First Name:</i>	_____
<< OK >> < BROWSE > < CANCEL >	

Figure 23. Patient Selection Window

When the candidate list is displayed, the user has the option to <**Select**>, <**Edit**>, <**New**>, <**SAMS**>, or <**Cancel**>. Selection allows the user to choose a patient and continue entering the encounter. The <**Edit**> option is used when the user wants to change information that is contained in the file, such as last name. If the patient is not found in the candidate list, <**New**> allows the user to enter the patient into the lookup file. Another option with NCAMD is the interface to the SAMS. If the patient is registered in SAMS, the <**SAMS**> option will copy this information into the NCAMD system. The <**Cancel**> function is used to abort the process.

<i>Select from the following candidates:</i>	
000-00-2222	DOE, JOHN
222-22-2222	FLINTSTONE, FRED
<Select> <Edit> <New> <Sams> <Cancel>	

Figure 24. Candidate List

The **Patient Enter/Edit** window is called from the previous window in Figure 24. It is displayed when the user selects <New>, <Edit>, <SAMS>, or when the patient cannot be found. After the data are entered the user either selects <OK> to save the record or <CANCEL> to abort the process.

Patient Enter/Edit	
Social Security:	<u>000 - 00 - 2222</u>
Last Name:	<u>DOE</u>
First Name:	<u>JOHN</u>
Middle Initial:	<u>A</u>
Date of Birth:	<u>07/13/65</u>
Sex:	<u>M</u>
Rate/Rank:	<u>HM1</u>
<p style="text-align: center;">« OK » < CANCEL ></p>	

Figure 25. Patient Enter/Edit Window

4.4.2 Encounter. After the **Encounter** option is selected from the Diagnosis menu, the patient Seek Function will be executed. If there is a pending encounter on the current patient, the system will prompt to <Resume> the current encounter, create a <New> encounter for the same complaint, or to <Cancel> this session.

System	File	Edit	Diagnosis	Window
			Register Patient Encounter Disease/Treatment Lookup SF600 Report Training Mode	

Figure 26. Encounter Option

System File Edit **Diagnosis** Window

Pending Encounters

Patient 000002222
Date 09/28/95

10:02:32 Acute abdominal pain

<Resume> < New > <Cancel>

Press the <F1> key for help

Figure 27. Pending Encounter

If the <New> screen is chosen, the screen shown in Figure 28 will appear.

System File Edit **Diagnosis** Window

Patient Encounter

Date 09/28/95 Time 10:02 Status P Provider 1
Patient Name DOE First JOHN
SSN 000-00-2222 Sex M Age 30

<Complaint> <Symptom> <Diagnosis> <Assist>

AGE => 30

<Explanation>

<Treatment>

<Print> <<Save>> <Cancel>

Data contained herein are subject to the Privacy Act of 1974.
Afford protection in accordance with SECNAVINST 5211.5C.

Figure 28. Patient Encounter Screen

For a new encounter, the first button to be selected is **<Complaint>**. When the complaint button is activated the following window will appear:

The screenshot shows a window titled "Diagnosis Window" with a menu bar (System, File, Edit, Diagnosis, Window). The patient information section includes: Date 09/28/95, Time 10:02, Status P, Patient Name DOE, SSN 000-00-2222, Sex M, Provider First JOHN, Age 30, and Encounter 1. Below this, there are two main sections: "<Complaint>" and "<Diagnosis>". The "<Complaint>" section contains a text box with "AGE =>30". The "<Diagnosis>" section contains a list of symptoms: "Acute abdominal pain", "Acute chest pain", "Acute ocular pain", and "Head or spine injury". To the right of this list are two buttons: "<Select>" and "<Cancel>". A vertical scrollbar is visible on the right side of the symptom list.

Figure 29. Complaint Window

Once the complaint has been entered, the symptom information can be added. Notice that the first information in the symptom window is age. If this were a pending encounter, some of the symptom information already may have been entered. Select the **<Symptom>** button to continue entering information.

The screenshot shows the same "Diagnosis Window" as Figure 29, but with the "Acute Abdominal Pain" complaint entered. Below the complaint, there are two main sections: "<Symptom>" and "<Assist>". The "<Symptom>" section contains a text box with "AGE => 30". The "<Assist>" section contains a large empty text box. Below these sections are three buttons: "<Print>", "<<Save>>", and "<Cancel>".

Figure 30. Symptom Window

When the <Symptom> button is selected the question window will open. After answering the question, either select <OK> to accept the answer or <Cancel>. Cancel will stop the question-and-answer session.

The screenshot shows a window titled "System File Edit Diagnosis Window". Inside, there's a header section with "Date 09/28/95", "Time 10:02", "Status P", "Patient Encounter", "Provider", and a page number "1". Below this, it says "Patient N" and "SSN 000". A button labeled "<Complain" is visible. The main area contains the question: "Which of the following best describes the Site of the pain at ONSET". Below the question is a list of options, each preceded by an empty checkbox:

- [] RIGHT UPPER QUAD
- [] LEFT UPPER QUAD
- [] RIGHT LOWER QUAD
- [] LEFT LOWER QUAD
- [] UPPER HALF
- [] LOWER HALF
- [] RIGHT HALF
- [] LEFT HALF
- [] CENTRAL
- [] GENERAL
- [] RIGHT FLANK
- [] LEFT FLANK
- [] NO PAIN AT ONSET

 At the bottom of the window are two buttons: "< OK >" and "<Cancel>". On the left side, there's a vertical stack of buttons: "<Symptom>", "<Diagnosis>", and "<Cancel>". The "<Symptom>" button is currently selected, and the "<Diagnosis>" button is highlighted with a thick border.

Figure 31. Question Window

Use the <Diagnosis> button to open the Disease window after all of the questions have been answered. Notice that the Disease window has 3 options that allow the user to <Select> the marked diagnosis; <View> a description of the marked diagnosis, or <Cancel>.

The screenshot shows a window titled "System File Edit Diagnosis Window". Inside, there's a header section with "Date 09/28/95", "Time 10:02", "Status P", "Patient Encounter", "Provider", and a page number "1". Below this, it says "Patient Name DOE" and "SSN 000-00-2222". A button labeled "<Complain" is visible. The main area contains the text "Acute abdominal pain" and "<Diagnosis>". Below this is a list of diseases:

- APPENDICITIS
- NONSPECIFIC ABDOMINAL PAIN
- RENAL COLIC
- PERFORATED DUODENAL ULCER
- CHOLECYSTITIS
- SMALL BOWEL OBSTRUCTION
- PEPTIC ULCER DISEASE
- MESENTERIC ADENITIS
- DIVERTICULITIS

 At the bottom of the window are three buttons: "<Select>", "< View >", and "<Cancel>". On the left side, there's a vertical stack of buttons: "<Symptom>", "<Diagnosis>", and "<Cancel>". The "<Diagnosis>" button is currently selected, and the "<Symptom>" button is highlighted with a thick border.

Figure 32. Disease File

Once the diagnosis is entered, select the <Assist> button for the computer to compute a diagnosis.

Figure 33. Assist Window

While NCAMD is analyzing the information entered, the following sign will appear on the screen.

Figure 34. Calculating Message

When the calculations are completed, the predicted diagnosis will appear in the <Assist> window (Figure 35) and the <Explanation> button will be enabled.

The screenshot shows a window titled "Diagnosis Window" with a menu bar: System, File, Edit, Diagnosis, Window. The window contains the following fields and controls:

- Patient Encounter:** 1
- Date:** 09/28/95 **Time:** 10:02 **Status:** P **Provider:** First JOHN
- Patient Name:** DOE **Sex:** M **Age:** 30
- SSN:** 000-00-2222
- <Complaint>:** Acute abdominal pain
- <Diagnosis>:** APPENDICITIS
- <Symptom>:** A list box containing:
 - AGE 45
 - SITE AT ONSET RIGHT LOWER Q
 - SITE AT PRESENT RIGHT LOWER Q
 - APPETITE DECREASED
- <Assist>:** A list box containing:
 - APPENDICITIS
 - NON SPECIFIC ABDOMINAL PAIN
- <Explanation>:** A button.
- <Treatment>:** A text field.
- Buttons:** <Print>, <<Save>>, <Cancel>

Figure 35. Calculated Diagnosis

The <Explanation> button can be selected after the diagnosis is computed. The <HOW> function lists the differences between signs and symptoms of the selected diagnosis and the NCAMD predicted diagnosis. Select <OK> to close the window.

The screenshot shows a window titled "Diagnosis Window" with a menu bar: System, File, Edit, Diagnosis, Window. The window contains the following fields and controls:

- Patient Encounter:** 1
- Date:** 09/28/95 **Time:** 10:02 **Status:** P **Provider:** First JOHN
- Patient Name:** DOE **Sex:** M **Age:** 30
- SSN:** 000
- <Compla>:** A list box containing:
 - AGE
- <Diseases on File>:** A list box containing:
 - APPENDICITIS
 - NONSPECIFIC ABDOMINAL PAIN
- Buttons:** < HOW >, < VIEW >, < OK >
- Buttons:** <Print>, <<Save>>, <Cancel>

Figure 36. Explanation Window

The <VIEW> function can be used for two purposes: to display the disease description or to capturing treatment information for the treatment field.

Disease Description

Appendicitis (APPEND), Acute appendicitis

Acute appendicitis results from a bacterial invasion of the appendix with inflammation. Incidence is highest in adolescents and young adults, peaking between ages 15 and 24. Typically the pain initially is poorly localized in the periumbilical region.

1. **TREATMENT PROTOCOL AT A GLANCE.** (see detailed discussion of treatment below; this section is for quick reference). Definitive treatment of acute appendicitis is surgical. Notify command of need for immediate MEDEVAC. The treatment goals are pending MEDEVAC.

A. Place patient at strict bed rest with head of bed slightly elevated. Monitor vital signs, fluid intake and output, and progress of symptoms and examination.

<<OK>>

Figure 37. View Treatment Explanation

The next step is to enter treatment information. This can be either typed directly into the treatment window, or taken from the disease file.

System File Edit **Diagnosis** Window

Date 09/28/95 Time 10:02 Status P Provider 1
Patient Name DOE First JOHN
SSN 000-00-2222 Sex M Age 30

<Complaint> **Acute Abdominal Pain** <Diagnosis> **APPENDICITIS**

<Symptom>

AGE => 30

<Assist>

APPENDICITIS
NONSPECIFIC ABDOMINAL PAIN

<Explanation>

Enter treatment in here.

<Print> <<Save>> <Cancel>

Figure 38. Treatment Information

Figure 39 shows data being captured while using the <Edit> function and the <Explanation> <View> function.

System	File	Edit	Diagnosis	Window
		Undo Redo Cut Copy Paste		

Disease Description

1. **TREATMENT PROTOCOL AT A GLANCE.** Definitive treatment of acute appendicitis is surgical. Notify command of need for immediate MEDEVAC. The treatment goals are pending MEDEVAC.

A. Place patient at strict bed rest with head of bed slightly elevated. Monitor vital signs, fluid intake and output, and progress of symptoms and examination.

<< OK >>

Figure 39. Edit Treatment Information

The information captured can then be pasted and edited in the patient encounter by using functions from **Edit** menu.

System
File
Edit
Diagnosis
Window

Date 09/28/95 Time 10:02 Status P Provider 1

Patient Name DOE First JOHN

SSN 000-00-2222 Sex M Age 30

Patient Encounter

<Complaint> **Acute Abdominal Pain**
<Diagnosis> **APPENDICITIS**

<Symptom>

AGE => 30

<Assist>

APPENDICITIS
 NONSPECIFIC ABDOMINAL PAIN

<Explanation>

<Treatment>

Notified the command of the need for immediate MEDEVAC. The treatment goals are pending MEDEVAC. Placed patient at strict bed rest with head of bed slightly elevated. Monitoring vital signs, fluid intake and output, and progress of symptoms and examination.

<Print>
<<Save>>
<Cancel>

Figure 40. Treatment Information

The encounter is completed and can be saved and/or printed. Use <Cancel> to exit.

System File Edit **Diagnosis** Window

Patient Encounter

Date 09/28/95 Time 10:02 Status P Provider 1
Patient Name DOE First JOHN
SSN 000-00-2222 Sex M Age 30

<Complaint> **Acute Abdominal Pain** <Diagnosis> **APPENDICITIS**

<Symptom>

AGE => 30

<Assist>

APPENDICITIS
NONSPECIFIC ABDOMINAL PAIN

<Explanation>

<Treatment>

Notified the command of the need for immediate MEDEVAC ...

<Print> <<Save>> <Cancel>

Figure 41. Save Encounter

When the <Print> option is selected, a print dialog box (Figure 42) will appear. The information may be copied to a file or sent directly to the printer. To save an encounter to a file, select the File (*) option in the print encounter box, then enter the name of the report, and select the <OK> button. To send an encounter to the printer, select Printer (*) option in print encounter box, then <OK>.

System File Edit **Diagnosis** Window

Patient Encounter

Date 09/28/95 Time 10:02 Status P Provider 1
Patient Name DOE First JOHN
SSN 000-00-2222 Sex M Age 30

<Complaint> Acute Abdominal Pain

AGE
SITE AT ONSET
SITE AT PRESENT
NAUSEA
APPETITE

Print Encounter

Print Encounter to: (*) File
() Printer

Filename: REPORT.TXT

< OK > <Cancel>

<Print> <<Save>> <Cancel>

ITIS
st> ▼▲
NAL PAIN ▼▲

Figure 42. Print Encounter

4.4.3 Disease/Treatment Lookup. This option allows the user to review the disease description and treatment protocol. The **Disease/Treatment Lookup** file contains 7 sections: Disease Description, Discussion, Differential Diagnosis, Treatment of Disease, Usual Course with Treatment, Complications, and Management of Complications. When this option is selected from the **Diagnosis Menu** the following popup list of descriptions or treatment information will appear. To end this process select **<Quit>** or to view any particular disease or treatment description simply selected the disease on the scrolling window, then select the **<View>** button.

DISEASE/TREATMENT REFERENCES		
ACUTE PANCREATITIS		
ANGINA		
APPENDICITIS		
CHEST INFECTION		
CHOLECYSTITIS		
INGUINAL HERNIA		
NONSPECIFIC ABDOMINAL PAIN		
<Select> <View> <Quit>		

Figure 43. Disease Table Reference

4.4.4 SF600 Report. This option extracts the encounter data and compiles it into the SF600 report format. The report can either be sent to a printer or stored in a file. The **<Edit>** option allows this report to be modified.

System	File	Edit	Diagnosis	Window
			Register Patient Encounter Disease/Treatment Lookup SF600 Report Training Mode	

Figure 44. SF600 Report

The **SF600 Report** option allows the user to fill in social security number, last name, first name and/or encounter date. If any field is unknown leave it blank. The input process allows partial information to be entered. Use a question mark "?" for a single unknown character. To

look up the existing patient encounter in the system, at least one field must be entered. Select **<OK>** when finished, **<Browse>** to see the entire patient encounter listing, or **<Cancel>** to quit.

Convert Encounter to SF600 Report

Social Security: - -
Lastname: DOE
Firstname:
Encounter Date: / /

« **OK** » **<BROWSE>** **<CANCEL>**

Figure 45. Create SF600 Report

A candidate list will then appear for the user to either **<Select>** a patient from the list or to **<Cancel>** the process.

Patients in File

[0000002222] Doe, John

< Select > **<Cancel>**

Figure 46. Patient Candidate List

After the correct patient is selected, the system will search the encounter for a specified date. Select **<OK>** to continue or **<Cancel>** to quit.

Patient: 000002222
Date: 9/29/95

000002222 14:44:38 Acute Abdominal Pain

< OK > **<CANCEL>**

Figure 47. Patient Data Screen

The **Report Editing** screen appears after the report is generated. Read it carefully and make necessary changes. Press **<Save>** to save the change, **<Print>** to output the report, **<Cancel>** to quit out the option. The output device can be either a file or printer. If choosing a **<File>**, remember to enter the filename at the filename field. Select **<OK>** when sending the report to a device, or **<Cancel>** to abort the process. See Appendix A for editing commands.

Report Editing

This 30 Years old male presents with pain over his whole chest, which radiates to the left arm. The pain began about 2 days to a week ago and was gradual in onset. The patient has been in continuous pain. He describes the pain as sharp. Numbness is absent. The pain is moderate in severity and seems to be getting worse since it began. By history, coughing makes the pain worse, and pentaphenabarbitol and gin seems to make the pain better. The patient reports dyspnea associated only with this illness. The patient has no cough. Sputum is absent. Orthopnea is absent. Paroxysmal nocturnal dyspnea is absent.

< Print > < Save > < Cancel >

Figure 48. Report Editing Screen

4.4.5 Training Mode. When this option is selected, information is stored in a temporary file and not in the permanent database.

Section 5 Appendices

A. Text Editor Commands	A1
B. Encounter Forms	B1
C. Installation Guide	C1

Cursor Movements	
Right Arrow	Move one character to the right
Left Arrow	Move one character to the left
Up Arrow	Move up on line
Down Arrow	Move down one line
Home	Move to the end of the line
End	Move up one window-full of text
PgUp	Move down one window-full of text
Ctrl + Right Arrow	Move one word right
Ctrl + Left Arrow	Move one word left
Ctrl + Home	Move to the beginning of text
Ctrl + End	Move to the end of text

Select Text with Key Board	
Shift Arrow Keys	Select a range of characters
Shift Arrow Keys	Select a range of words
Shift + Ctrl + Arrow	Select from cursor to beginning of text
Shift + Ctrl + End	Select from cursor to end of text
Ctrl + A	Select entire document

Select text with Mouse	
Drag	Select a range of characters
Double-click	Select a range of words
Double-click and drag Keys	Select from cursor to beginning of text
Triple-click	Select from cursor to end of text
Triple-click and drag	Select entire document

Delete and Replace	
Place cursor to the right of the character, press Backspace, or place cursor at the character, press Delete	Delete a characters
Place cursor anywhere in word, press Ctrl+Backspace	Delete a words
Select and press Backspace	Delete a selection
Select text to be replaced, type new text (or Paste)	Replace existing text

Cut, Copy and Paste	
Select the text, press Ctrl+X or use Cut in the Edit menu	Cut Text
Select the text, press Ctrl+C or use Copy in the Edit menu	Copy Text
Press Ctrl+V or use Paste in the Edit menu	Delete a selection
Select text, press Ctrl+V or use Paste in the Edit menu	Replace existing text

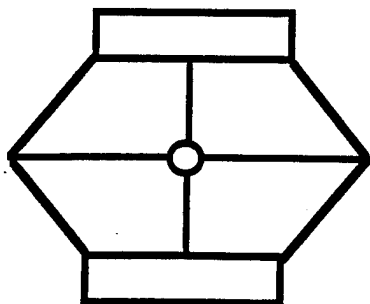
ABDOMINAL PAIN DATA SHEET

SSN:

DATE/TIME:

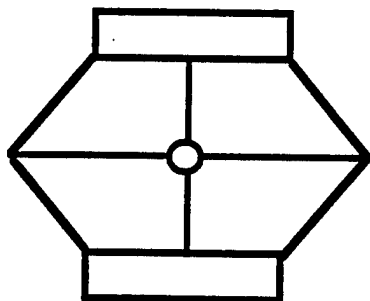
AGE: SEX:

SITE OF PAIN AT ONSET



RUQ LUQ
RLQ LLQ
Upper Half
Lower Half
Right Half
Left Half
Central
General
Right Flank
Left Flank
No Pain

SITE OF PAIN AT PRESENT



RUQ LUQ
RLQ LLQ
Upper Half
Lower Half
Right Half
Left Half
Central
General
Right Flank
Left Flank
No Pain

OTHER SYMPTOMS:

NAUSEA: Yes No
APPETITE: Decreased Normal
VOMITING: Yes No
JAUNDICE (Hx or yellow skin /sclera) Yes No
BOWELS: Normal Constipated
URINATION: Normal Frequency
Diarrhea Blood in Stool Painful Darker Urine
Mucus in Stool Blood in Urine

TYPE OF PAIN :

(free of pain at times = Intermittent,
constant = steady, constant but
varying in intensity = colicky)

Intermittent Steady Colicky

PROGRESS OF PAIN:

(at time of examination)

Better
Same
Worse

DURATION OF PAIN:

(How long has the pt
had the pain?)

_____ hours

SEVERITY OF PAIN:

(If in obvious distress = severe,
everything else = moderate)

Moderate Severe

AGGRAVATING FACTORS:

(have patient move, cough)

Movement Cough Food
Breathing Other None

RELIEVING FACTORS:

Lying Still Vomiting
Antacids Food
Other None

PAST HISTORY

PREVIOUS INDIGESTION:
Yes No

PREVIOUS SIMILAR PAIN:
Yes No

PREVIOUS SURGERY:

(Intraoperative abdominal
surgery or trauma)

Yes No

PREVIOUS ILLNESS:

(any illness requiring
hospitalization)

Yes No

TAKING MEDICATIONS:

Yes No

OB/GYN HISTORY

PERIODS: PREGNANCY:

Not Started Impossible
Ceased Possible
Regular Confirmed
Irregular

LAST PERIOD: FAINT/DIZZY:

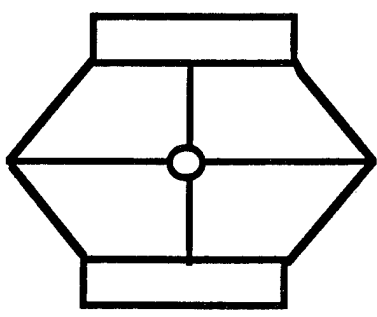
Normal Yes
Late/Overdue No

VAGINAL
DISCHARGE:

Yes Yes
No No

PREV GYN HX:

PHYSICAL EXAM

VITAL SIGNS Temperature: _____ Blood Pressure _____ Pulse Rate _____ Systolic: _____ Respiration _____ Diastolic: _____		GENERAL/LAB MOOD: (obvious distress or physical symptoms = distress, concern about illness = anxious) Normal Anxious Distressed COLOR: (consider temp., check palms & conjunctiva on black or oriental) Normal Pale Flushed Cyanotic Jaundiced	
SITE OF TENDERNESS (area of significant pain, palpate most painful last) <div style="text-align: center;">  </div> RUQ LUQ RLQ LLQ Upper Half Lower Half Right Half Left Half Central General Right Flank Left Flank No Pain		WBC COUNT: _____ ABDOMINAL EXAM INSPECTION: (wavelike movement = visible peristalsis, pt. unable to touch hand with belly button = decreased/ absent) Normal Visible Peristalsis Decreased Abd. Movement ABDOMINAL SCARS: Yes No GUARDING: (voluntary tightening of abd. muscles, pt. can relax with gentle persuasion) Yes No MASSSES: (localized abdominal swelling) Yes No BOWEL SOUNDS: (normal unless markedly hyperactive or absent) Normal Absent Hyperactive DISTENSION: (generalized swelling or bloating of entire abdomen) Yes No	
MURPHY'S SIGN (pt. on back knees bent: hook fingers under r. coastal margin at mid-clavicular line, sevr pain on inspiration = Murphy's Sign) Yes No		RECTAL EXAM (distinguish between pain and discomfort) Normal Mass Felt L. Tender R. Tender General Tenderness Yes No	
CORPSMAN'S DIAGNOSIS: Appendicitis Nonspecif Abd Pain Renal Colic Perf. Duod Ulcer Cholecystitis Small Bowel Obs. Other: _____ Medical Officer's DIAGNOSIS: Appendicitis Nonspecif Abd Pain Renal Colic Perf. Duod Ulcer Cholecystitis Small Bowel Obs. Other: _____ MEDEVAC: Yes No			

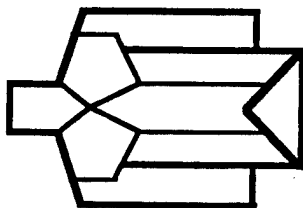
CHEST PAIN DATA SHEET

DATE/TIME:

SSN:

AGE: SEX:

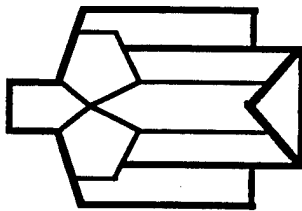
SITE OF PAIN



Central
Chest
L. Side
R. Side
Epigastric
Other

PAIN RADIATION

Yes None
L Arm R Arm
Both Arms
Back
Shoulders
Neck
Jaw
Throat
Fingers/Hands
Epigastric
Other



DURATION OF PAIN

(How long has the pt had the pain?)

____ Hours

NUMBNESS: Yes No

ONSET OF PAIN: Sudden Gradual

TYPE OF PAIN

Tight Gripping Dull
Sharp Burning Stabbing
Hvy/Press/Crush Aching Nagging

SEVERITY OF PAIN

(do not ask if obvious distress = severe everything else = moderate)

Moderate Severe

AGGRAVATING FACTORS

Movement Cough Breathing
Sitting Lying Down/Rest
Leaning Forward Other
None

OTHER SYMPTOMS:

DYSPNEA: Absent This Illness Chronic
ORTHOPEA: (inability to breath except when upright) Yes No
COUGH: Absent This Illness Chronic
PND: (post-nocturnal dyspnea) Yes No
SPUTUM: Yes No
REFLUX
NAUSEA: Yes No
APPETITE: (recent change) Normal Decreased
VOMITING: Yes No
BOWELS: (recent change) Normal Constipated Diarrhea

PAST HISTORY:

PREVIOUS CHEST PAIN: SMOKER: Yes No
PREVIOUS C-R ILLNESS: POSITIVE Hx: MI Angina
HISTORY MAJOR SURGERY: Bronchitis Hypertension Diabetes None

PHYSICAL EXAM

VITAL SIGNS		BLOOD PRESSURE		EXAMINATION		RESPIRATORY MOVEMENT:	
TEMPERATURE	_____	SYSTOLIC:	_____	EDEMA:	Absent	Normal	(abnormal = dif. between full inspire & full expire. gt 2 inches, or expansion of sides unequal, otherwise = normal)
PULSE RATE	_____	DIASTOLIC:	_____	Ankles	Other	Abnormal	
RESPIRATION	_____			SWEATING:	(not due to environ. or exercise)	PERCUSSION:	(percuss front & back; dull = less resonant than normal, hyper res. = markedly more than normal)
				Yes	No	Normal	Dull
				SHIVERING:	(not due to environ. or exercise)	Hyper-Resonant	
				Yes	No	CHEST SOUNDS	(compare l. & r. sides: rhonchi = cont. musical sounds, rales = discrete, non cont. sounds, decreased = 1 side markedly less)
				Normal	Rhonchi	Normal	Rales
				Decreased			
				COLD/CLAMMY:	JUGULAR VENOUS PRESS.:		
				Yes	(pt. reclined at 45 deg., chin at 30 deg., to left miniscus more than 1/2 dist to claval = raised, otherwise = normal)		
				No			
				TENDERNESS CALVES:	Normal		
				Yes	Raised		
				No	Lowered		
				TENDERNESS CHEST:	HEART SOUNDS:		
				Yes	(if 1st & 2nd sounds= lub-dub then normal, other = abnormal)		
				No	Normal		Abnormal

CORPMAN's DIAGNOSIS: MI ANGINA Non-Specific Chest Pain CHEST INFECTION OTHER: _____

Medical Officer's DIAGNOSIS: MI ANGINA Non-Specific Chest Pain CHEST INFECTION OTHER: _____

MEDEVAC: Yes No

This Appendix contains the listings of the four files used in the installation of the CAMD system; CAMDREAD.DOC, INSTALL.BAT, INSTALL.TXT and CAMD.BAT. The CAMDREAD.DOC contains the instructions for installing the CAMD system. The INSTALL.BAT is the batch file that installs the CAMD system from the three floppy disks to the hard drive. The INSTALL.TXT contains the messages that are displayed during installation. The CAMD.BAT is the batch file that starts the CAMD system once it has been installed.

CAMDREAD.DOC.

Computer-Assisted
Medical Diagnosis
Installation.

The CAMD system needs 20 Mega bytes on a hard drive. This package includes a 3.5" high density (1.44M) floppy disks.

To install the CAMD system, complete the following:

1. Put CAMD INSTALLATION DISK into disk drive (A or B)
2. Goto floppy disk drive. Type A: or B:
3. Type> INSTALL -option d:

option: -a extract all
 -d only extract database.
 -u only extract utility files.
 -x only extract excutable file.
drives: d: destination drive (c: or d:)

EXAMPLE: INSTALL -a c:

4. In the root directory (C:\) modify or add the FILES and SHELL commands in the CONFIG.SYS file. The FILES command should be set to 50 or more (FILES=50). The SHELL command should read:

 SHELL=COMMAND.COM /P /E:512) for DOS 3.2 +
or SHELL=COMMAND.COM /P /E:32) for DOS 3.1 and
 below.

5. Reboot the system.
6. At the DOS prompt type C:\CAMD>CAMD.
7. The password is CAMD.

INSTALL.BAT	<pre>echo off :install.bat hll@nhrc if "%2"==" " goto L1 cls type install.txt pause cls if exist %2\camd goto camd md %2\camd :camd cd %2\camd if "%1"=="-a" goto all if "%1"=="-d" goto data if "%1"=="-u" goto util if "%1"=="-x" goto exe goto L1 :all camd.exe -d %1\camd goto done :data camd.exe -d data*. * %2\camd goto done :util camd.exe -d util*. * %2\camd goto done :exe camd.exe -d bin*. * %2\camd :done cls echo Remove Disk from Drive echo CAMD installation completed!!! goto end :L1 echo format: INSTALL -option d: echo option: -a extract all echo -d only extract database. echo -u only extract utility files. echo -x only extract excutable file. echo d: destination drive (c: or d:) echo EXAMPLE: INSTALL -a b: c: :END</pre>
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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
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6. AUTHOR(S) LY, H.L., MERRILL, L.L. & PEARSALL, D.M.				
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13. ABSTRACT (Maximum 200 words) The Navy Computer-Assisted Medical Diagnosis (NCAMD) system is designed to assist Independent Duty Corpsmen (IDCs) in rendering a medical diagnosis. The NCAMD system was written using Microsoft FoxPro, Version 2.0, database management system. For each encounter the signs, symptoms, and laboratory information collected can be gathered on data entry forms created for NCAMD or entered directly (real time) into the system. A Chronological Record of Medical Care (SF600) can be generated automatically to document the encounter. The NCAMD system User's Guide was written to familiarize the IDCs with the NCAMD software. The keyboard and mouse commands necessary to run the various options are explained in conjunction with the associated screens.				
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